ABSTRACT OF THE DISCLOSURE

A deposition method may include, at a first temperature, contacting a substrate with a first precursor and chemisorbing a first layer at least one monolayer thick over the substrate. At a second temperature different from the first temperature, the first layer may be contacted with a second precursor, chemisorbing a second layer at least one monolayer thick on the first layer. Temperature may be altered by adding or removing heat with a thermoelectric heat pump. The altering the substrate temperature may occur from the first to the second temperature. The second layer may be reacted with the first layer by heating to a third temperature higher than the second temperature. A deposition method may also include atomic layer depositing a first specie of a substrate approximately at an optimum temperature for the first specie deposition. A second specie may be atomic layer deposited on the first specie approximately at an optimum temperature for the second specie deposition different from the first specie optimum temperature.